

<b>Scaptococcus</b>	<b>parvicirculus</b> (55)
<b>californicus</b> (63)	<b>quercinus</b> (59)
<b>milleri</b> (67)	<b>ventralis</b> (67)
<i>Spilococcus</i>	<i>Trionymus</i>
<b>cactearum</b> (55)	<b>frontalis</b> (67)
<b>ceanothi</b> (67)	<b>fervus</b> (67)
<b>corticosis</b> (67)	<b>haanicheni</b> (55)
<b>haigi</b> (59)	<b>myersi</b> (57)
<b>keiferi</b> (55)	<b>quadricirculus</b> (67)
<b>parkeri</b> (59)	<b>winnemucae</b> (67)

Some of the insects and related groups named in honor of Howard L. McKenzie are as follows:

#### ACARINA

*Aculodes mckenziei* Keifer (Eriophyidae)

*Amblyseius mckenziei* Schuster and Pritchard (Phytoseiidae)

#### HOMOPTERA

*Dysmicoccus mackenziei* Beardsley (Pseudococcidae)

*Humococcus mackenziei* Ezzat (Pseudococcidae)

*Lindingaspis mackenziei* Williams (Diaspididae)

*Ovaticoccus mackenziei* Miller (Eriococcidae)

*Parlagena mckenziei* Balachowsky (Diaspididae)

*Selenediella mckenziei* Takahashi (Diaspididae)

#### DIPTERA

*Tujunga mackenziei* Steyskal (Otitidae)

## Two New Species of *Caloptilia* Associated with *Rhus* in California

(Lepidoptera: Gracilariidae)

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Sweet (1969) carried out an extensive study of the life histories and host preferences of two species of *Caloptilia* which occur in California. While attempting to identify these species it was discovered that they are both undescribed. In this paper I will describe both of these species and will compare them with *Caloptilia rhoifoliella* (Chambers): New Combination, the other species in the complex. All three species feed upon members of the genus *Rhus* (Anacardiaceae).

The generic name *Caloptilia* is used for these species in preference to *Gracilaria* in accordance with the revision of the family by Vari (1961).

***Caloptilia ovatiella* Opler, new species**

(Figs. 1, 6, 7, 10)

MALE.—Alar expanse, 11–12 mm. *Head*: palpi upturned, scaled with white and dark brown intermixed; frons covered with white scales, few dark brown scales intermixed; vertex dark brown, paler posteriorly; antennae dark brown. *Thorax*: light brown on dorsum, dark brown on pleural areas and sternum; pro- and mesothoracic legs dark brown basally; tibia and tarsi white-scaled; metathoracic legs with coxae and basal third of trochanters white-scaled; apical two-thirds of trochanters dark brown; femora, tibiae, and tarsi with mixture of white and pale brown scales. *Forewing*: brown, with lavender iridescence when alive or recently so, fading to pale sheen in museum specimens; patch of dark brown scales along basal fifth of costal margin followed by long white patch extending nearly to apex enclosing about six small patches of dark brown; few light brown scales intermixed throughout white patch as well; narrow strip of dark brown scales along middle half of inner margin; remainder of wing brown with small scattered patches of dark brown scaling, becoming heavier apically; ventral surface dark brown, narrowly edged with light brown on margins; fringe on outer margin of broadened dark brown scales; fringe scales along inner margin long and tan. *Hindwing*: tan with pale fringe. *Abdomen*: clothed with tan scales. *Genitalia*: vesica with linear row of 24 approximately parallel straight spines; aedeagus strongly curved; valvae with dorsally directed flap-like process one-third width of valva projecting from ventral margin of inner face at basal one-third; transverse bar-like process on inner face of valva from base at dorsal edge to ventral edge at two-thirds; process with slightly bulbous area at juncture with ventral margin covered with long inwardly directed setae.

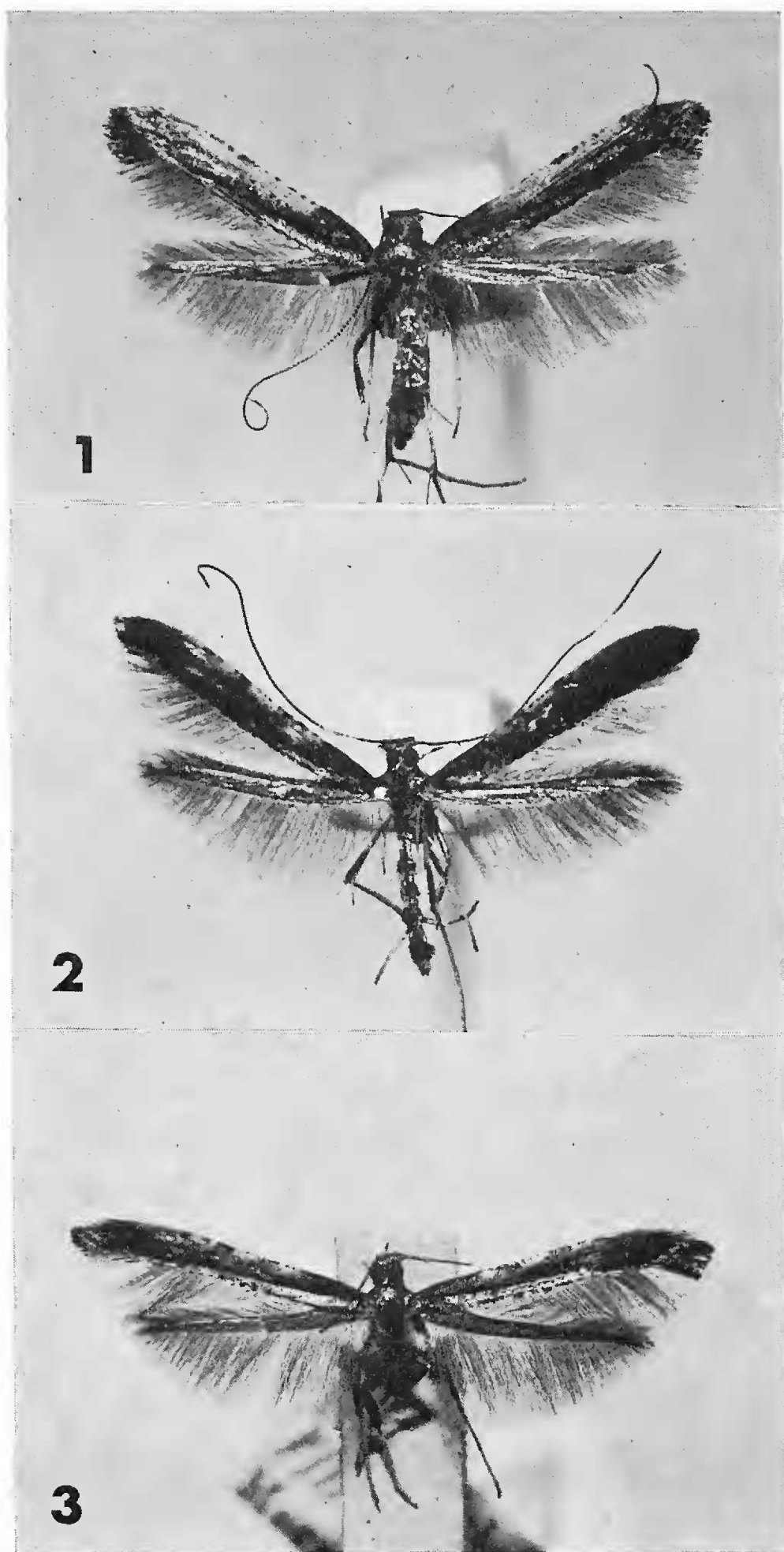
FEMALE.—Alar expanse, 12–13 mm. In male except: female genitalia with two equally sized curved signa.

*Holotype male*, EATON CANYON, NEAR ALTADENA, LOS ANGELES COUNTY, CALIFORNIA, Harold Sweet laboratory colony, reared from *Rhus ovata*, emerged 26 August 1968, P. Opler genitalia prep. 7, deposited in California Academy of Sciences.

Paratypes: 22, same data except emerged July 1968 (5), 19 August–3 September 1968 (17); 10 same locality data reared from *Rhus laurina*, emerged 2–24 August 1968; and 29 from South Laguna Beach, Orange County, California, Harold Sweet laboratory colony, reared from *Rhus integrifolia*, emerged 2–20 August 1968; one paratype San Gabriel Wash, 5 mi. S. Azuza, Los Angeles County, California, 29 March 1968, JAP 68C72, reared from *Rhus laurina*, emerged 21 April 1968, P. A. Opler. Paratypes deposited in collections of California Academy of

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FIGS. 1–3: FIG. 1. *Caloptilia ovatiella*, ♀, Eaton Cyn., Los Angeles Co., Calif., H. Sweet lab. colony, reared from *Rhus ovata*, emerged July 1968. FIG. 2. *C. diversilobiella*, ♂, Strawberry Cyn., Alameda Co., Calif., H. Sweet lab. colony, reared from *Rhus diversiloba*, emerged 17 August 1968. FIG. 3. *C. rhoifoliella*, ♂, New Brighton, Pa., 18 August 1907, ex Merrick Museum, U.S.N.M.



Sciences, California Insect Survey, Canadian National Collection, and U.S. National Museum.

DISCUSSION.—Sweet (1969) reared this species from *Rhus ovata*, *R. laurina*, and *R. integrifolia*. The distribution of this species coincides with that of its hosts in southern California (Sweet, 1969) and presumably in northern Baja California.

***Caloptilia diversilobiella* Opler, new species**

(Figs. 2, 4, 8, 11)

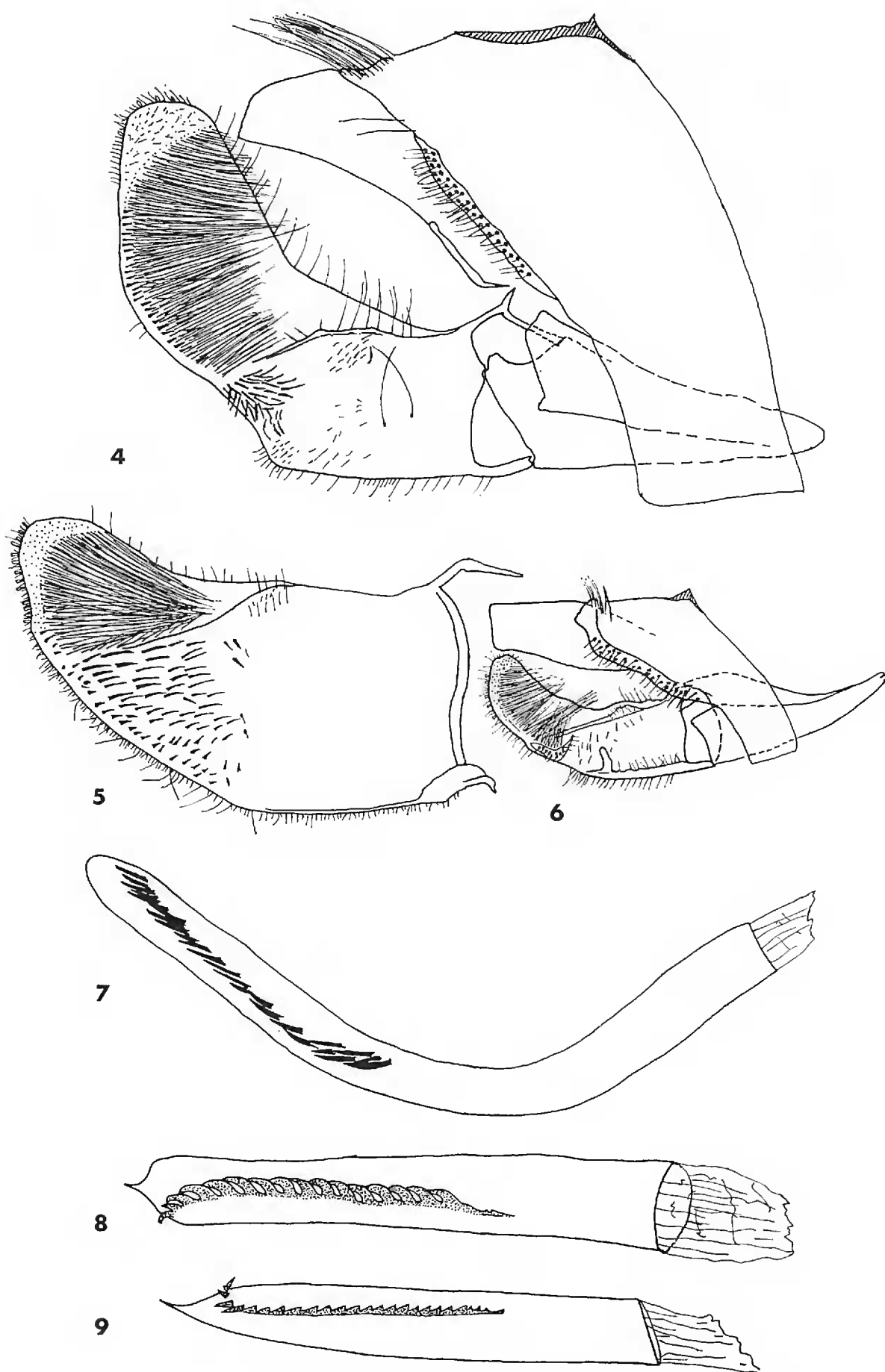
MALE.—Alar expanse, 11–13 mm. *Head*: palpi upturned, tip of distal segment white-scaled, remainder dark brown; frons white-scaled; vertex covered with anteriorly directed dark brown scales; antennae blackish brown. *Thorax*: dark brown or orangish brown on dorsum and pleural areas; sternum white; pro- and mesothoracic legs with tibiae and tarsi white; femora and trochanters dark brown; coxae white; metathoracic legs with coxae and basal third of trochanters white-scaled with few scattered dark brown scales; apical two-thirds of trochanters dark brown; femora, tibiae, and tarsi with light tan scales. *Forewing*: with purplish iridescence when alive, gradually fading in museum specimens; ground dark brown or reddish-brown with scattering of dark brown scales, variable, if ground reddish-brown then with patch of dark brown at base of costal margin; irregular white patch along costal margin beginning at basal one-fifth, terminating just before apex, widest at base; reddish-brown scales occasionally invading patch along inner edge, sometimes white completely replaced by reddish-brown; narrow black marks along costa within patch; ventral surface dark brown, narrowly edged with light brown on margins; fringe on outer margin of broadened dark brown scales; fringe along inner margin of long pale tan scales. *Hindwing*: pale tan with fringe of long pale tan scales. *Abdomen*: clothed with gray scales. *Genitalia*: vesica with posteriorly directed row of 15–17 hook-like spines; aedeagus relatively straight; valvae with long thin setae on apical half of inner face extending to just basad of transverse bar along ventral margin; patch of relatively short stout setae near ventral edge of valva basal to transverse bar.

FEMALE.—Alar expanse, 10–12 mm. External features as described for male; genitalia not distinguishable from that of *C. ovatiella*.

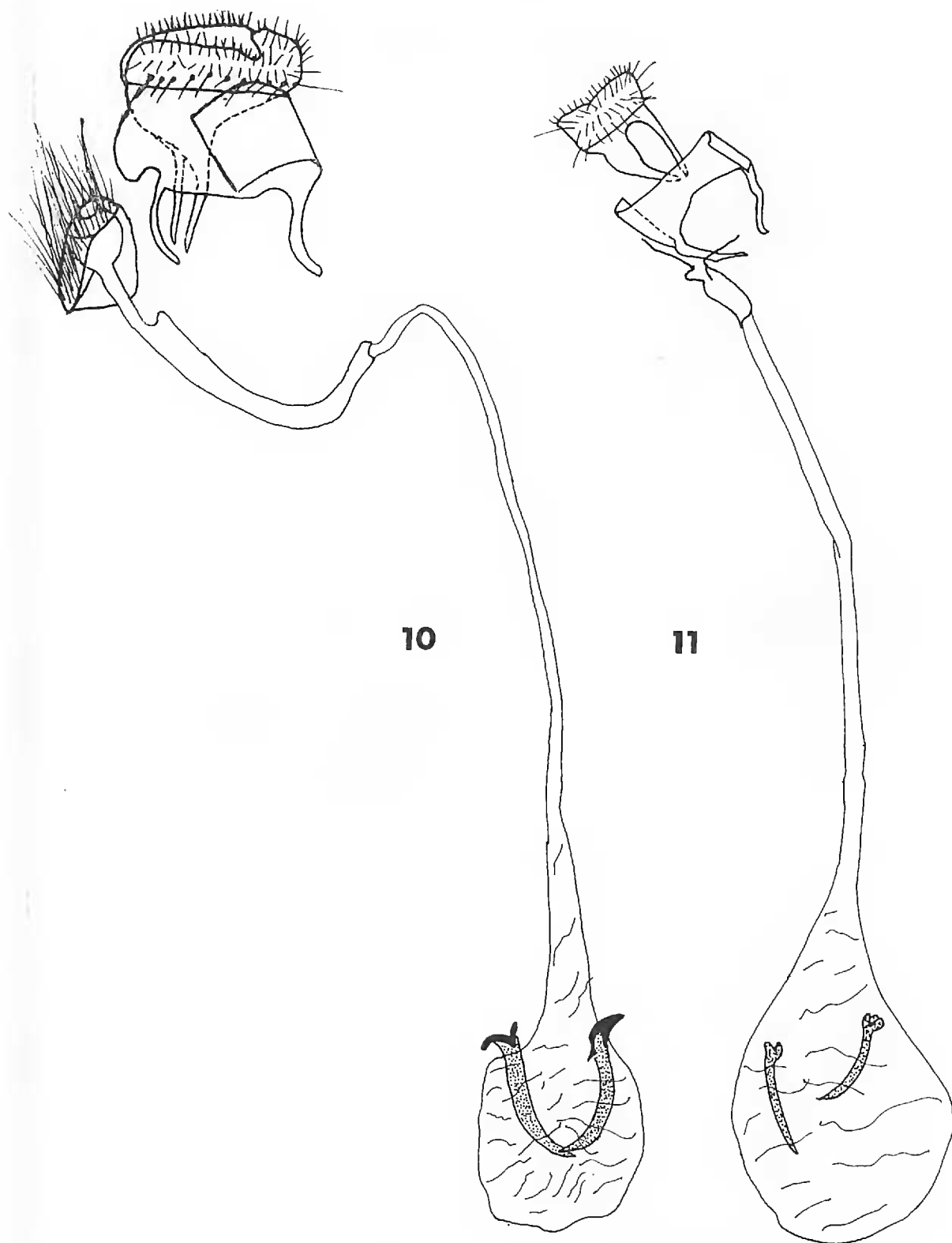
*Holotype male*, STRAWBERRY CANYON, ALAMEDA COUNTY, CALIFORNIA, Harold Sweet laboratory colony, reared from *Rhus diversiloba*, emerged 17 August 1968, P. Opler genitalia prep. 6, deposited in California Academy of Sciences.

Paratypes: 55, same data except emerged May to June 1968 (20), 9–22 August 1968 (30), 23 November 1965 (3), 8 December 1965 (2); 64, Arroyo Seco, Los Angeles County, California, Harold Sweet laboratory colony, reared from *Rhus diversiloba*, emerged 2–19 August 1968; 22, Jarboe Gap, Butte County, California, Harold Sweet laboratory colony, reared from *Rhus diversiloba*, emerged 9 June–6 July 1968; 13 additional paratypes collected as adults in field as follows: California. Contra Costa Co.: El Cerrito, 5 February 1961, 2 June 1960, 27 September 1960 (C. D. MacNeill, CAS); Richmond, 22 May 1959, 9 July 1959 (C. D. MacNeill,





FIGS. 4-9. Male genitalia of *Caloptilia* species, FIG. 4. *C. diversilobiella*, right valva removed. FIG. 5. *C. rhoifoliella*, left valva. FIG. 6. *C. ovatiella*, right valva removed. FIG. 7. *C. ovatiella*, aedeagus. FIG. 8. *C. diversilobiella*, aedeagus. FIG. 9. *C. rhoifoliella*, aedeagus.



FIGS. 10-11. Female genitalia of *Caloptilia* species, FIG. 10. *C. ovatiella*. FIG. 11. *C. diversilobiella*.

CAS), 8 October 1966 (A. J. Slater, CIS); Russell Property, 4½ mi. NE Orinda, 2 November 1967 (P. A. Opler, CIS); Humboldt Co.: near Myer's Flat, 31 August 1960 (C. D. MacNeill, CAS); San Francisco Co.: San Francisco, ex *Quercus agrifolia*, 30 August 1926 (H. H. Keifer, CAS); San Mateo Co.: San Mateo, 2 mi. W., 7 September 1926 (H. H. Keifer, CAS); Santa Clara Co.: New Almaden, 5 July 1964, 14-16 September 1963 (P. A. Opler, CIS). Paratypes deposited in collections

of California Academy of Sciences, California Insect Survey, Canadian National Collection, Los Angeles County Museum, and U.S. National Museum.

DISCUSSION.—*Caloptilia rhoifoliella*, a species which occurs in eastern North America, can be distinguished from *C. diversilobiella* only by examination of the male genitalia. The aedeagus of *C. rhoifoliella* (fig. 5) has the vesica with a row of 24 triangularly shaped unhooked spines in contrast with the lesser number of hooked spines on the vesica of *C. diversilobiella* (fig. 8). The valva of *C. rhoifoliella* has a more extensive group of short, stout, setae on the inner face and, concomitantly, fewer long narrow setae (fig. 5) than does *C. diversilobiella* (fig. 4). It is not surprising that such a close relationship should exist between these two species since the hosts, *Rhus diversiloba* for *C. diversilobiella* and *Rhus toxicodendron* for *C. rhoifoliella* are closest to each other within the genus *Rhus* in the taxonomic sense.

Sweet (1969) has reared *Caloptilia diversilobiella* from *Rhus diversiloba*; the moth occurs throughout the range of its host in California, commonly in coastal localities and more rarely in the Sierra Nevada. *Caloptilia rhoifoliella* has been reared from *Rhus toxicodendron* (Chambers, 1876; Criddle, 1927) and *Rhus copallina* (Chambers, 1876; Raizenne, 1952). *C. rhoifoliella* occurs from Manitoba east to Ontario thence south to Kentucky and North Carolina.

The specific distinctness of the two new species as well as the limits of their host selection was clearly documented in the laboratory by Sweet's studies. Individuals from different populations within species would freely breed in the laboratory, whereas in no case did copulation occur between individuals of different species. Females of either species would not oviposit on the host(s) of the other.

Five females, collected at Devil's Punchbowl, Los Angeles County, California at light on 1 May 1968 by P. Opler and J. A. Powell, appear to be closely related to *C. ovatiella*, but they do not appear to fall within the range of variation for the species as presented by the type series. None of the hosts reported by Sweet occurs in that area according to Munz and Keck (1959), although another species, *Rhus trilobata*, does occur there. Thus, there is a distinct possibility that a third species of the complex in California is involved. No attempt to deal with these specimens will be made in the absence of associated males and a substantiated host association.

#### ACKNOWLEDGMENTS

I wish to thank Harold Sweet, San Mateo College, whose provision of specimens and enthusiastic encouragement formed the *raison d'être* of

this paper. Donald R. Davis, U.S. National Museum, loaned two specimens of *Caloptilia rhoifoliella* to the author. Jerry A. Powell kindly reviewed the manuscript of this paper.

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### The Development of *Cactobrosis fernaldialis* and *Albareda parabates* in Relation to Temperature<sup>1</sup> (Lepidoptera: Pyralidae)

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*Cactobrosis fernaldialis* (Hulst) is the most important known vector of the bacterial disease, *Erwinia carnegieana* Standring, of the giant cactus or saguaro, *Cereus giganteus* Engelm. (= *Carnegiea gigantea* Britt. and Rose). Butler and Werner (1965) gave light-trap records for this species as well as *Albareda parabates* (Dyar) and *Cahela ponderosella* (B. and McD.), which are also cactus-eating moths, Boyle (1949) observed *C. fernaldialis* in the field and laboratory and concluded that there was but one generation a year. Eggs required 30 days to hatch, the larval stage in the giant cactus lasted from November to May, and the pupal stage was from 28 to 33 days. The present study indicates that the

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